Aberrations of *Abraxas grossulariata* Linnaeus *(Lep. Geom.)*

By E. A. Cockayne, D.M., F.R.C.P.

Plate III.

The following aberrations of *Abraxas grossulariata* Linn. are in the Rothschild-Cockayne-Kettlewell collection in the British Museum. They are all rare and in some cases only single examples are known to me. I consider that even when only one specimen of an outstanding aberration is known it should be named, so that when others are taken they can be recorded and appear in the indexes of British and continental periodicals. In this way a knowledge of their frequency and distribution becomes known. Until such forms are named we shall continue to get records such as " a wonderful aberration of *A* was exhibited by Mr. *X*," which conveys nothing to the reader.

I believe that most of these aberrations are recessive. Some are very local. Apart from one specimen bred from a Surrey larva and four or five from Lancashire all the examples of ab. *melanozona* Raynor came from one garden in Pitcaple. One ab. *nigrovelata* Cockayne is from Huddersfield and all the others from St. Anne's-on-Sea; two ab. *aurivestita* Cockayne were taken in the North of England and the rest, four or five in number, in London. The original ab. *melanoneura* figured by Mosley and Barrett must have been bred or caught before 1879 and no more were taken until Mr. Huggins caught two along the same hedge in successive years about 1911, and, so far as I am aware, it has not been found since. Even the well-known ab. *varleyata* Porritt only occurs naturally in a small part of Yorkshire.

The mutation, which is responsible for each of these rarities, must occur again and again, however infrequently, throughout the range of the species, and it is remarkable that they often appear to be so localized. The constitutional disability of the mutant is such that it dies out as fast as it arises by fresh mutation, and for each mutant the average frequency in the population remains constant, perhaps one in a thousand, one in ten thousand, one in a hundred thousand, or one in a million. The rarer it is the less often do two heterozygotes pair, and even when they do the whole brood or a large part of it may perish, and the homozygotes that reach maturity may never come under the eye of an entomologist. On the other hand in an isolated locality such as an old garden in a town, if the gene happens to be present and conditions are favourable, inbreeding is so close that the recessive mutant may recur year after year.

Ab. **venusta** ab. nov. (Fig. 1.)

On the forewing the basal black markings are large; in the median area there is a large black mark on the costa united to the discoidal spot and two or three spots nearer to the inner margin; the black fascia internal to the orange fascia is broad and only broken at one point, the orange fascia is broad and clear, and external to it there is only a single black spot near the inner margin; there is an elongated subapical black mark on the costa and the black spots on the margin are

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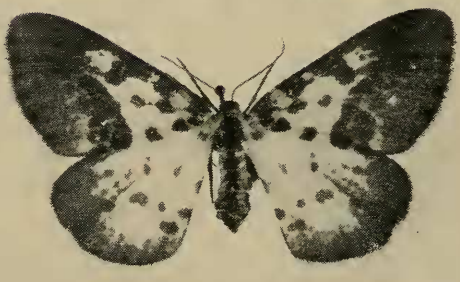

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all united to form a continuous band; on the left forewing there is an additional black spot internal to and touching the last marginal spot but one from the anal angle. On the hindwing there is a large discoidal spot, a complete row of black spots, and the spots on the margin are large and united to one another. The paratypes are less extreme; there are a few small spots outside the orange fascia and the marginal spots are not all confluent.

Type ♀ : Ravensknowle, Huddersfield, bred 20.v.1946 by E. A. Cockayne. This was the only one out of 1045 bred that year from wild larvae from the same garden.

Paratypes 2 ♀♀ : 1 ♀ : Bristol, bred by the Rev. Joseph Greene. Bankes coll. 1 ♀ (Rev. J. Greene coll.) Bankes coll.

There can be no doubt that this form was combined by the Rev. G. H. Raynor with the lightly marked wild form of ab. *albipalliata* to produce the beautiful forms of ab. *fulvapicata,* ab. *albipalliata,* and ab. *flavipalliata,* which are heavily marked, but with the spots external to the orange fascia small or absent, and with large or confluent marginal spots.

Ab. **sebaria** ab. nov. (Fig. 2.)

On the forewing there are two black spots at the base and external to these is an orange fascia, but the usual black fascia outside it is absent; there is a conspicuous round black discoidal spot in the median area, but no other marking; the orange fascia is present, but the usual black fascia internal to it is absent; the row of black spots external to the orange fascia is present, and the marginal spots are normal. On the hindwing of the type there is a black subapical spot and an incomplete row of marginal spots, but no other markings are present. In the paratype there are five very small spots internal to the orange fascia on the left forewing and none on the right. On the hindwing there is a large discoidal spot and some small marginal spots, but no others except an apical spot on the right and one near the anal angle on the left. The most notable feature of this aberration is the complete or almost complete absence of the black fasciae, which normally form the boundaries of the median area.

Type ♀ : Loc. incog. (Rev. Joseph Greene coll.) Rothschild coll.

Paratype ♀ : Alderley Edge, Cheshire, vii.1924, A. E. Tonge. Rothschild coll.

A specimen of this aberration with more spots in the hindwing is figured by Albertus Seba in his *Thesaurus,* 1765, vol. 4, Pl. 63, fig. 3.

Ab. **formosa** ab. nov.

The head, thorax, and abdomen are orange with no black markings. On the forewing the base is orange with two black dots external to it, there is a large black mark on the costa in the median area and an orange discoidal spot; just internal to the broad orange fascia is a black spot on the costa and a black dot near the inner margin but no other markings; there are no black spots external to the orange fascia on either wing and no black marginal markings on the right forewing, but there is a small irregular black mark on the margin of the left forewing near nervures 3 and 4. On the hindwing there are no black markings except a spot about the middle of the inner margin on each side.

Type: Loc. incog. The specimen was in the collection of Alfred Owen of Maghull near Liverpool and afterwards in that of S. J. Capper. Rothschild coll.

It is figured by S. L. Mosley, *Ill. Var. Brit. Lep.*, Abraxas Pl. 3, fig. 3; *Nat. journ.*, 1895, 4, 32, fig. 8; Barrett, Pl. 322, fig. 1b.

Ab. **ovalidisca** ab. nov. (Fig. 3.)

On the forewing the basal black spots are very large; the black antemedian fascia is very broad and forms an unbroken band; the postmedian fascia lying internal to the orange fascia is also unusually broad and is only narrowed at one point; there is no black spot on the costa in the median area and the discoidal spot is elongated and oval; the submarginal fascia which lies external to the orange fascia is unusually broad in the first five interneural spaces, there is small black dot in the seventh, and two rather large black spots in the last two spaces near the inner margin; the marginal spots are large and confluent and the third and fourth are united to the submarginal fascia. The normal orange of the thorax, abdomen, and fasciae is replaced by pale yellow. On the hindwing there is an elongated oval discoidal spot, a row of postmedian spots, and a single rather large spot on nervure 4 belonging to the submarginal row; some of the marginal spots are confluent.

Type ♀: Loc. incog. (J. A. Clark coll. 1910.) Cockayne coll.

Paratype ♀: same data.

The type and paratype resemble one another closely and probably formed part of the same brood. The aberration has a facies unlike that of any other form of *grossulariata* that I have seen. The distinctive feature is the oval elongated discoidal spot on all four wings.

Ab. **melanoneura** ab. nov.

The aberration is rather heavily marked and all the nervures on both fore and hindwings are black; the black lines so formed are thick in the proximal part of the wing, but become thinner distally and disappear towards the margin on both fore and hindwing.

Type ♀: Loc. incog. Bred by C. S. Gregson (Bright coll.) Rothschild coll. The specimen is figured by S. L. Mosley, *Ill. Var. Brit. Lep.*, Abraxas, Pl. 2, fig. 1; *Nat. Journ.*, 1895, 4, 113, fig. 4; Barrett, Pl. 331, fig. 1e.

Mr. H. C. Huggins records two examples (*The Entomologist*, 1911, **44**, 230), one of which he kindly brought to Tring to compare with the type. The resemblance is very great. Mr. Huggins caught the two specimens in successive years along the same hedge, but has never seen another. I do not know of any other record.

Ab. **radioreversa** ab. nov. (Fig. 4.)

On the forewing the black fasciae on either side of the orange fascia are united to form a broad band obliterating the orange fascia and sending out a row of tooth-like processes towards the termen; there is a broad black band along the costa running from the middle of the wing to the apex and the inner end of this is united to the discoidal spot and continued below to join the broad black fascial band enclosing an irregular white area; there is a black spot in the median area; the marginal spots are normal. On the hindwing the discoidal spot